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September 22, 1951

SCIENCE NEWS LETTER

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MEDICINE

Sex Hormones Fight Age

Sex hormones can restore virility to some men, stop some kinds of cancer when properly used. Misuse can activate cancer or lead to sterility.

➤ SEX HORMONES, responsible in part for turning boys and girls into men and women, can restore virility to some men, cushion the changes of middle age, brighten the minds of old women, check some kinds of cancer and stop its pain.

Improperly used, these same hormones can activate cancer and lead to sterility. Medical scientists have no doubt of this. And while still searching for better forms of sex hormones for medical treatment, they warn against use of any form of sex hormone preparation without a doctor's advice.

The sex hormones are steroid chemicals. They are produced by the ovaries and the testes. The outer part of the adrenal glands, producer of the anti-arthritis hormone, cortisone, also produces steroid hormones which are much like the hormones from the sex glands.

Scientists call the female sex hormones estrogens and the male hormones androgens. Testosterone, said to be the most powerful androgen, has been obtained from fresh bull testes and also has been made synthetically from cholesterol. Development of a new form of testosterone, said to be longer acting and more than twice as powerful as the older forms, has just been announced.

Medically, testosterone is used for young men who have lost both sex glands by surgery or disease and to help bring maturity to boys who are slow in development. In the first case it is replacement medicine, something like insulin for diabetics. In the second, the results are not lasting unless the pituitary gland in the head is able to produce, and the sex glands respond to, a pituitary hormone which stimulates production of androgen by the testes.

Testosterone is dangerous for middle-aged, would-be Romeos. It can stimulate the growth of dormant cancer cells present in the prostate glands of many men. These dormant cancers are most often found in the prostate glands of men in their forties and fifties.

For older men with advanced prostate cancers, the estrogens, or female hormones, are often given. Pain is relieved and the cancers that have spread to the bones are checked. Many patients have been able to return to work and get a longer lease on life.

Both androgens and estrogens, male and female hormones, are used to treat cancer in women, the particular hormone depending on the patient's age, type of cancer and other factors determined by the physician. This type of treatment is still being studied.

Sex hormones should not be confused with what the boys in the smoking room mean by sex. These chemicals play a necessary part, but only a part, in sexual behavior. Psychological factors and acquired behavior patterns also play their parts.

The androgens and estrogens are not sex specific, either. Both are present in varying amounts in normal men and women. And the stallion, one of the most "masculine" of animals, produces an extremely large quantity of estrogens, or so-called female sex hormones.

Science News Letter, September 22, 1951

PUBLIC HEALTH

Record Low Achieved For Maternal Mortality

➤ A RECORD low maternal mortality rate, a halving of the measles death rate and significant drops in the death rates from tuberculosis and infantile paralysis occurred in the United States during 1950 compared with 1949.

The death rate for cancer remained about the same for the two years, which might be considered a gain since it means at least a temporary halt in deaths from this disease.

The record low maternal death rate is estimated at 7.2 deaths of mothers per 10,000 live births.

The heart disease death rate increased slightly in 1950, U. S. Public Health Service vital statistics show.

Science News Letter, September 22, 1951

CHEMISTRY

Gas from Cheap Fuel; Wood Waste for Wallboard

➤ LOW COST manufactured gas is produced by a new process from powdered fuel and air, a French chemist told the World Chemical Congress in New York.

Peat, lignite, brown coals, soft coal or atomized fuel oil are mixed with steam and either air or oxygen. Chemical action occurs and the process is continuous, Dr. Kurt Baum of the Pan-European Industrial Plants Co., Paris, explained.

Many thousands of tons of wood waste that would otherwise be lost can be made into strong hard wallboard by a process described by Dr. Louis G. Ricciardi of the Polytechnic Institute of Brooklyn. Instead of using expensive resins small amounts of simple inexpensive chemicals are used to unite chemically with the lignin in the wood to cause it to become an effective binder.

In addition to sawdust, chips, shavings, slabs and edgings of wood, the process can use straw, sugarcane bagasse, sisal fiber, coconut fiber, and waste from other vegetation.

Science News Letter, September 22, 1951

PHYSICS

First Space Ships To Have Flying Saucer Shape

➤ FLYING SAUCERS may well become a reality, but they will belong to this world, "not to visitors from Mars," Ernest G. Reuning, an astronomer working at the U. S. Army's Map Service in Washington, believes.

A saucer- or disk-like shape is quite possible for our first space ships, he says, for aerodynamic reasons—because of the effect of air passage on the ship when it is in the denser layers of our atmosphere. If the ram-jet principle of propulsion is used for early space ships, as Mr. Reuning believes likely, slot-like exhausts give about the largest heating surface per volume of gas thrown back, he has calculated.

These slots would be widest at the edge, narrowing down at the center, in effect making the entire ship look like an oversized flattened ram-jet engine, giving it a somewhat flounder-like appearance.

Mr. Reuning, who bases his calculations on information available to the general public, discussed the possibilities of travel in outer space at a meeting of the National Capital Astronomers in Washington.

Science News Letter, September 22, 1951

INVENTION

Improved Casein Fibers Hardened with Metal Salts

➤ TEXTILE FIBER of casein from milk will be more durable and have improved chemical and physical properties, it is claimed, by a process utilizing titanium, zirconium or tin salts as a hardening agent.

The inventors claim they have found that they obtain an improved casein fiber by treating the artificial material after coagulation, but before drying, in a water solution of a salt of a metal selected from the group consisting of titanium, zirconium or tin. In addition to improved chemical and physical properties the resulting fiber is curly and has acquired wool-like properties.

Inventors of the process are John F. Corwin, Unadilla, John R. Calhoun, Bainbridge, and Thomas M. Buzzo, Unadilla, N. Y. Rights are assigned to the Borden Company of New York City. The patent number is 2,567,184.

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AERONAUTICS

Step Toward Pilotless War

New radio-guided jet bomber brings the airman one step nearer technological unemployment. Pilotless light bomber squadron will be trained to use B-61.

➤ THE NEW guided jet bomber announced by the Air Force last week brings the pilot one step nearer technological unemployment. But the day when we can dispense with pilots flying off "into the wild blue yonder" is still some time away.

The guided missile is one of the "fantastic weapons" being developed for the armed services. Known as the B-61, or Matador, it is a pilotless light bomber and is being produced by the Glenn L. Martin Co. of Baltimore, Md.

The missile has been described as somewhat resembling a smaller edition of the B-51 medium bomber. It is launched from the ground and flies under its own power. Crews trained to operate the Matador will be trained at the Missile Test Center, Cocoa, Fla., beginning the first of October.

It is limited in range to the distance the high frequency radio signals which control it can travel. This means a few hundred miles. Thus, if the B-61 is to travel deep into enemy territory, it—or a flock of B-61's—must be accompanied by a piloted mother ship which would control the pilotless planes.

Unlike a true guided missile, the B-61 will not be used for defense against enemy bombers or missiles. Its function will be offensive. Because of its limited range, its use in strategic warfare will probably not be extensive.

However, in areas of enemy troop concentration, close to the front lines, particularly when protected by heavy barrages of antiaircraft, the guided B-61 might prove extremely useful. In such instances, antiaircraft fire would only threaten loss of the plane, not both the pilot and the plane. Without human lives to consider, greater chances could be taken with the plane.

For the same reasons, a similar pilotless medium bomber might prove useful against enemy fleet concentrations, always protected by heavy antiaircraft. Of course, accurate enough controls will have to be used.

No information has been given as to the weight or number of bombs that can be carried by the B-61. It is likely that it would be able to carry A-bombs. Whether these expensive destructive agents would be entrusted to pilotless planes is another question.

There is no reason why the largest planes to be developed could not do without their pilots and crews. Guided planes so small that they could not possibly bear the weight of a pilot have been in use for some time—principally as targets for antiaircraft practice.

Many types of true guided missiles are in various stages of testing. None have yet reached the development just announced for the B-61 as far as is known.

They are of four main classifications: surface-to-air, air-to-air, air-to-surface and surface-to-surface. Of these, the smallest can be air-to-air, for in general they travel less distance, therefore need less fuel. They are slated to be the principal artillery for air combat.

Surface-to-air guided missiles are equivalent to antiaircraft shells of greatly superior range and accuracy. They are our defense from the ground against the modern high-flying, high-speed airplane, whether manned or pilotless.

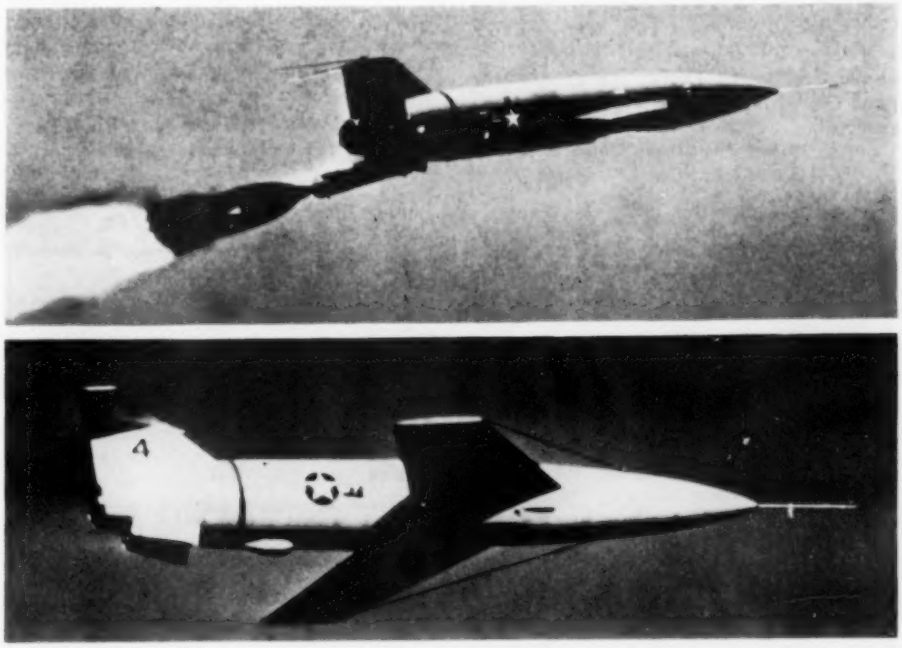
Surface-to-surface missiles are the super long-range artillery, of which the German V-2 was the forerunner. Post-war research and development have vastly improved the slugging range and accuracy of these giants. Presumably they can easily be made large enough to carry atomic bombs.

Air-to-surface missiles can be guided by a radar-television combination to smash directly on the target. "Mother" planes flying many miles away, beyond the range of the surface-to-air weapons of the defenders, could control such missiles, changing their course if necessary.

The new B-61 will be controlled by radio waves, as are all guided missiles. The waves keep the planes on the path to the target and sometimes signal when the plane shall drop its load of bombs. The actual instruments used in the planes and missiles are secret in detail, but they respond to radio waves of different types to activate mechanisms which in turn activate fins and rudders on the outside of the plane's body.

These radio waves travel with the speed of light and, therefore, when released by the controller, reach the plane or missile practically instantaneously. The controller uses radar to keep track of the missile on its course. If great range is planned, a series of radar and control stations several hundred miles apart would be necessary.

The origin of radio control of a pilotless moving vehicle might be said to be the driverless automobiles that were stunt-driven some 25 years ago by radio operators in accompanying cars. During World War II, war-weary airplanes loaded with explosives but unoccupied by men were sent against German targets under radio control from a mother ship. Many notable trips have been made by so-called drone planes, including those from which photographs were taken automatically in radioactive regions close to exploding atomic bombs in the Bikini and Eniwetok tests. The drone planes were flown by "pilots" in mother ships several miles away.



THE MATADOR—Two views of the U. S. Air Force's B-61, Matador, the pilotless light bomber now in production. In the upper picture a fuel tank is being jettisoned by the plane. The plane's shape and design indicate that the pilotless guided missile could carry A-bombs.

The Navy Bat, developed late in the war, was a guided missile of another sort. It was a giant bomb in a winged casing similar to a plane. It was carried aloft under the wings of a bomber. It had radar sending and receiving equipment in its nose. When a target was sighted from the bomber, the Bat's radar beam was set on the target and the missile was released. Radar kept it on its course, even though the target might be moving.

Devices within a guided missile can send out radar waves which are reflected back if they encounter solid matter. The reflected waves bring the missile close enough so that its proximity fuse causes a destructive explosion.

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METEOROLOGY

East and West to Be Warmer than Usual

➤ FALL WEATHER, at least until mid-October, will be warmer than normal in the area east of a diagonal line stretching from western Maine to Louisiana and also in the states west of the Rockies.

It will be colder than usual in all the great plains states and the western Great Lakes states. In the boundary areas between the colder-than-normal region and the warmer-than-normal region, temperatures are expected to be about average. This is the prediction of the Weather Bureau's Extended Forecast Section for the period extending to Oct. 15.

More than the usual amount of rain will fall over a wide belt extending from Texas and Louisiana northeast through the Ohio Valley, the Great Lakes and New England. The extreme Southeast and the states west of the Continental Divide can expect little rain. Elsewhere the usual rainfall can be expected.

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GENETICS

Women Can Be Bleeders

➤ WOMEN can have hemophilia, contrary to popular and medical reports up to now.

This hereditary "bleeder's disease" was once known as "the curse of the Hapsburgs" because so many members of this European royal family were affected.

From earliest times it has been thought that only males had the disease, while the women of the family transmitted it without having it themselves.

Now three cases of the disease occurring in women have been discovered. The third, a 24-year-old woman who nearly bled to death two weeks after the birth of a child, is reported by Drs. M. C. G. Israels, H. Lempert and Elizabeth Gilbertson of Manchester, England. (LANCET, June 30).

Only one possible combination of inheritance can lead to hemophilia in a girl or woman. That is when a man with hemophilia marries a woman who is a carrier of the bleeding disease. The combination has been considered a deadly one. If a female hemophiliac was conceived, she would be born dead, according to previous medical opinion.

The patient reported from Manchester has the double inheritance necessary for a woman to have hemophilia. In addition, modern methods of testing her blood show beyond doubt that she is hemophilic. Her father is a known hemophiliac. Her mother's brother, who bled to death following an accident, was a known hemophiliac. The patient's mother is therefore a presumed carrier of hemophilia. The patient's sister is a carrier and has a hemophilic son. The patient's little daughter will be a carrier.

Other cases of women with a bleeding disease like hemophilia have been reported in the past. Because it was always believed that women could not have true hemophilia, these were considered cases of pseudo, or false, hemophilia.

Re-examination by modern methods of two such women has led another scientist, Dr. C. Merskey, to believe that these also are true hemophiliacs.

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Question Box

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GREAT INDIAN HORNBILL—Shown holding a specimen of this bird from Indo-China is S. Dillon Ripley, associate curator of Yale University's Peabody Museum. The bird is one of a "lost" collection recently purchased by Yale.

ORNITHOLOGY

Bird Collection Arrives

➤ OVER 4,000 bird specimens from Indo-China have now arrived at Yale University's Peabody Museum in New Haven, Conn., after being "lost" during the war.

Part of the collection originally built up by Monsieur Andre David-Beaulieu, a civil servant with the French Colonial regime in Indo-China, the birds were believed to have been destroyed when the Siamese were wresting their independence from the French.

Most of the specimens are from Laos, a mountainous and unexplored part of northern Indo-China. S. Dillon Ripley, assistant professor of zoology at Yale and associate curator of the Peabody Museum, learned from a war-time friend, who became an official of the new Siamese government and who was later killed, of a collection of birds in that sector.

After many months of investigation and negotiation with M. David-Beaulieu and the Siamese government, the collection was identified and arrangements made to ship the birds that had not been destroyed—in 1945 there were about 7,000 specimens—to the U. S.

"Even in its reduced state the collection is still the most important single collection from Laos in the United States," Mr. Ripley said. "Thanks to the cooperation of M. David-Beaulieu and of friends in Siam, we have been able to find a new home for the collection here at Yale."

The story behind the purchase of the birds and their original collection reads much like a cloak-and-dagger thriller, Yale officials state.

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GENERAL SCIENCE

Experts on Danger Areas Listed in Defense Rosters

➤ THE DEFENSE Department is finding out who in this country are experts on foreign areas of potential danger—like Iran, the Far East, eastern Europe. Through the Office of Naval Research it has authorized the listing of something like 40,000 people with M.A. degrees or better who have knowledge that could be useful to the Defense Department.

The American Council of Learned Societies has begun compiling a roster of the nation's language specialists, economists, historians, anthropologists, archaeologists, demographers, international law experts, students of philosophy and religion, political scientists, sociologists and statisticians.

Questionnaires for these groups will particularly seek information on knowledge of foreign countries. Until now, the government has never had this information.

The $43,000 study is under the direction of Fletcher Wellemeyer, staff adviser on personnel studies of the A. C. L. S. Executive officer will be Dr. Taulman Miller, economist on leave from the University of Indiana.

They will seek cooperation of the learned societies to which these experts belong in achieving as complete a listing as possible. The Bureau of Labor Statistics will analyze the questionnaires. First group to be listed will be the political scientists.

This roster of those in social science and humanities fields will take its place alongside the scientific roster being created by the Office of Education. With these two lists the government will be able to put its finger on almost any kind of expert it needs.

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MEDICINE

Electrons Sterilize Arteries

➤ PIECES OF human arteries taken from dead bodies have been frozen and sterilized by high-voltage cathode rays and then successfully grafted to arteries coming from the hearts of two living persons.

The cases are believed the first in which this sterilization procedure for human tissue grafts has been done. They are reported by Drs. Irving A. Meeker, Jr., and Robert E. Cross of Harvard Medical School in Boston, in the journal, SCIENCE (Sept. 14).

High-voltage cathode rays have previously been used to kill germs and thus sterilize foods. Adaptation of the method to sterilization of tissues was made with the cooperation of Prof. John Trump of Massachusetts Institute of Technology where the food sterilization method was developed.

For sterilizing tissue for grafting, the tissue must be frozen. This is necessary to prevent damage to the tissue by rays strong enough to kill the germs.

The first two patients on whom these frozen irradiated grafts were used had the very serious condition known medically as coarctation of the aorta. The condition is one in which the aorta, big artery from the heart, is greatly narrowed so that the heart has to pump very hard to get any blood through for the rest of the body.

The condition is relieved by an operation in which the narrowed part of the aorta is cut out and the ends stitched together. Sometimes, as in the two cases reported recently, the ends will not meet and a piece of artery from an artery bank must be used to bridge the gap. Supply of material for such purposes has been limited heretofore by the difficulty of getting and keeping artery pieces that are free of germs.

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PHYSICS

Atomic Reactor in Norway

Second atomic reactor known to be constructed outside of English-speaking nations and possibly Russia is sponsored by Norwegian and Dutch governments.

➤ AN ATOMIC energy reactor, the second known to be constructed outside of English-speaking nations and possibly Russia, is being sponsored by the Norwegian and Dutch governments at Kieller, near Oslo, Norway. It has operated for about two months.

This was made known in New York to the Twelfth International Congress of Pure and Applied Chemistry by Drs. Gunnar Randers and Odd Dahl of the Institute of Atomic Energy, at Kjeller.

Using 2.8 tons of uranium metal in 6.5 tons of heavy water, the atomic pile will produce up to 100 kilowatts of energy. Intended for research purposes only, this low power reactor is expected to be used by visiting scientists who will live in special apartments provided.

Heavy water is the moderating or controlling substance used because it can be produced in Norway through use of hydroelectric power which is used to convert water into its hydrogen and oxygen components, which can then be separated into their isotopes. The Nazis tried to produce heavy water in Norway for atomic energy experiments during World War II but Allied bombing wrecked the plants.

Control of the reactor is through ionization chambers filled with boron trifluoride. These keep track of the reactor's activity and slow it down through cadmium plates in the space between the two-foot thick reflecting graphite and the reactor tank.

In case of accident and if the rate of neutron production threatens to turn the reactor into a bomb, a remotely controlled valve can flood the whole mechanism with heavy water.

Only France is definitely known to have an atomic reactor outside of America, Canada, England and possibly Russia.

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RADIO

Coast-to-Coast TV Soon

➤ COAST-TO-COAST television from east to west will begin on Sept. 30 on a regular schedule, but federal permission to erect broadcasting stations to make full use of the transcontinental network will be delayed at least a year.

The coast-to-coast television transmission becomes possible with a radio-relay system recently completed from Omaha to California which now stretches the system across the country. It is primarily for telephone service but will be used part time for television. Present plans call for its use with TV five hours a week. Before the end of another month, equipment will be ready for regular west-east transmission, it is expected. Experimentally, it was used in connection with the Japanese Peace Treaty Conference at San Francisco.

The government freeze on television broadcasting stations, which went into effect in September 1948, was expected to be lifted by the Federal Communications Commission later this year and permission for new stations authorized. Permits will have to be delayed, the FCC has announced, because of the increased demands for licenses and the large number of protests against stations tentatively proposed.

At the present time there are 109 television broadcasting stations in the United States. These stations bring television programs to a high percentage of the nation's population, but there are vast areas outside reception limits. The government freeze was due to a shortage of wavelength channels in the air within the very-high-frequency band now used by television. Nearby stations must employ widely separated wavelengths or they interfere with each other.

Using present channels, and new channels that will be possible with the development of ultra-high-frequency for TV, the federal office expected to give some 2,000 stations room to operate. FCC tentatively allotted 1,256 cities 1,965 station outlets. Cities not served are raising objections to proposed assignments. Over 1,200 such protests have been received. The result is that the FCC must take additional time to give full consideration to these protests.

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MEDICINE

Female Hormone Sparks Minds of Older Women

➤ OLDER WOMEN can be rejuvenated mentally by treatment with female sex hormone, it appears from results reported by Drs. B. Mcd. Caldwell, R. I. Watson and W. B. Kountz of Washington University School of Medicine to the Second International Gerontological Congress in St. Louis.

They can think better, they are more willing to spend intellectual energy, they remember better and they are not so set in their habits and ways of thinking.

Psychological tests showing this improvement in a group of women whose mean age was 76 were reported at the meeting. Previously the St. Louis doctors had reported that women in the city home for the aged seemed more alert and interested, felt better and showed more initiative, energy and social responsiveness when getting the female hormone treatment.

The tests reported bore out these impressions.

The hormone treatment gives better results if continued for one year than if given for only six months.

The good results reported do not mean a panacea has been "miraculously" found for all the ills and infirmities of old age, the St. Louis doctors stated. But they believe that, if these results are reached with other groups, the method opens the way to treatment having "definite psychological benefits for older females in our culture."

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GEOGRAPHY

Israel May Play Role of Switzerland in Middle East

➤ ISRAEL MAY well become the Switzerland of the Middle East, while on a smaller scale she may play a role in the region similar to Japan before 1939, in the opinion of C. G. Smith, University of Oxford geographer.

The Oxford geographer points out that Israel's main advantage for industrial production is undoubtedly her population, which consists of numerous highly skilled personnel, together with others used to a very low living standard, to whom the incentives and pioneer spirit found in Israel are a great stimulus.

Israel's natural resources are very poor. She has no domestic coal supplies, iron ore, metallic minerals or oil, but despite this disadvantage she already has a car and truck assembly plant at Haifa, a shoe factory at Jerusalem, a plastics factory at Ako, two automobile tire plants at Petah Tiqva and Hadera, a concrete pipe plant at Migdal Gad, and the nucleus of a steel industry. A glass and ceramics factory is going up in Beersheba.

To establish economic solvency, Israel will have to rely on low relative costs, marketing skill, and a variety of low-weight, high-cost articles.

Mr. Smith believes that recent trends such as the export of low-priced dentures, radio sets, woolen textiles, and chocolate to markets as dispersed as western Europe, Turkey and Yugoslavia supports his view, given in a report to the British Association for the Advancement of Science, as to Israel's future economic position in the Middle East.

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TECHNOLOGY

X-Rays Test Airplane Parts

➤ AS MANY as 3,000 X-ray photos are made daily in the plant of the Boeing Airplane Company at Seattle, Wash., in testing metal parts before they are assembled into an aircraft.

Magnetic tests are also used, and sound waves, too high in pitch to be heard by the human ear, are employed to detect hidden flaws deep inside metals.

All raw materials, parts and assemblies received from suppliers and subcontractors are subjected to various tests before they are used in an airplane. This assures that they reach the high specifications required in the construction of a sturdy plane. Important among them is the long-used, so-called Rockwell test to determine if the metals in the manufactured parts have the proper hardness.

When X-rays are shot through a piece of metal, any flaws within will show up on a photograph. Similar results are obtained with the reflectoscope which directs ultrasonic sound waves into the metal and receives them back reflected from the opposite surface.

Magnetism is used to discover minute surface and other imperfections in steel castings and forgings. The piece under test is put in a machine called the magnaflux which magnetizes the part. A liquid containing iron oxide is forced to flow over the part. If there are any invisible cracks or breaks in the surface, the iron oxide collects at them since opposite magnetic poles are set up on their edges by the magnetic field.

Detection of flaws in non-ferrous castings is made with the help of an oil-base fluid of low surface tension and high capillary attraction. When castings are soaked in the fluid for sufficient time, the cracks become filled with it. Washing removes the coating of the fluid but not that in the cracks. Joined by a developer of inert powder in another fluid, the material in the cracks reveals all imperfections with clarity when placed under ultraviolet light.

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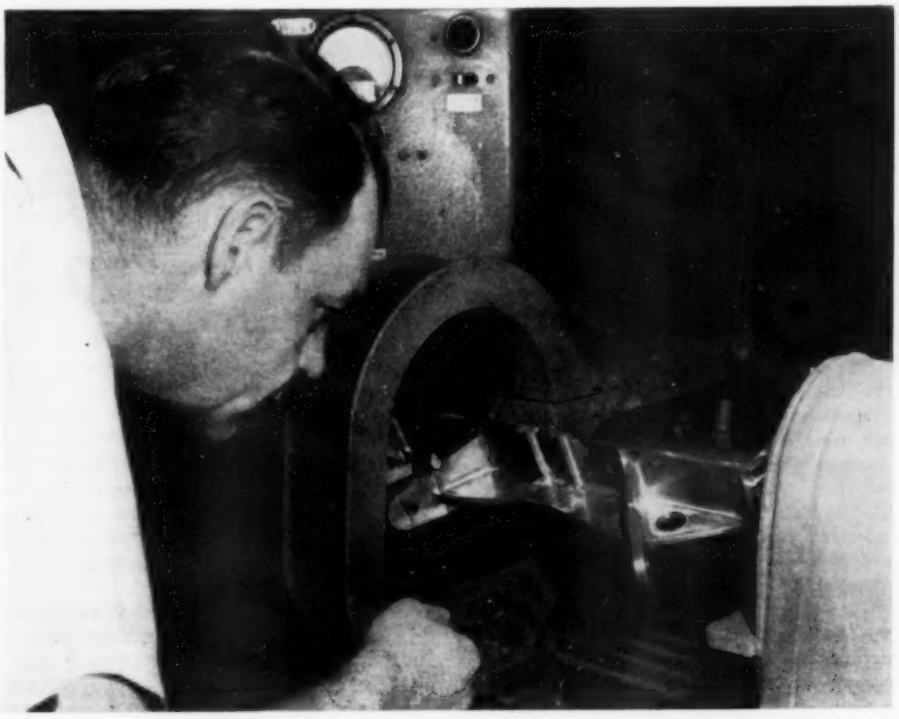

MAGNAFLUX TEST—A Boeing Airplane Company technician here examines a machined casting which shows a crack under magnaflux test. The crack is outlined on flat portion extending at right angles from the two small studs in the center of the piece.

SURGERY

Extra Ribs More Common in Females

➤ AN EXTRA rib near the neck, which occurs twice as often in females as in males, may be the cause of shoulder and arm pains, Dr. Alfred W. Adson of the Mayo Clinic reported at the U. S. Chapter of the International College of Surgeons meeting in Chicago.

The extra rib near the neck, called a cervical rib, is found in six of every 1,000 patients, he said. In more than half the cases they are discovered accidentally in routine X-ray examinations for other complaints.

When the extra rib causes pain by pressure on an artery or nerve, a muscle cutting operation, sometimes combined with partial removal of the extra rib, gives relief. Complete relief of all symtoms followed this operation in about 60% of the patients, Dr. Adson reported, with great improvement in another third who could return to their vocations with annoying twinges of pain only during certain movements.

Science News Letter, September 22, 1951

CHEMISTRY

Chemistry Gives Substitute For War-Scarce Materials

➤ CHEMISTRY IS providing substitutes for some of the war-scarce materials that are creating industrial shortages.

More than two million pounds of metallic copper annually are being saved by the substitution of organic chemical compounds, the dithiocarbamates, for copper used as an insecticide in orchards, Dr. John C. Dunegan of the U. S. Department of Agriculture at Beltsville, Md., told the Twelfth International Congress of Pure and Applied Chemistry in New York.

The same chemicals are also saving four to seven pounds of sulfur for every 100 gallons of insecticidal spray.

One of the oldest minerals known, gypsum or alabaster, used for making plaster from the days of the ancients, is now yielding sulfur in countries that do not have resources of elemental sulfur or pyrites, Dr. G. I. Higson of Imperial Chemical Industries, Ltd., of Durham, England, told the chemists. Calcium sulfate in these deposits is being turned into sulfuric acid and ammonium sulfate for fertilizer use in several European factories and one plant in India.

Science News Letter, September 22, 1951

INVENTION

Flame Melts Snow To Clear Streets

➤ SNOW PLOWS and snow loaders now have a rival in a snow melting device which utilizes a flame to melt the snow and ice on city streets. The equipment is mounted at the front of a truck or other vehicles, with the fuel tank on the vehicle. Combustion takes place in the so-called flame-throwing unit which extends across the front of the truck and shoots out hot flames into the snow.

Inventor is Benjamin S. Wilson, Akron, Ohio. Patent 2,566,473 was awarded to him. Flame can be regulated, and the flame-throwing unit can be raised or lowered relative to the ground. Preheated fuel is fed to it under pressure.

Science News Letter, September 22, 1951

MEDICINE

Stiff Joints Limbered By Vitamin Treatment

➤ STIFF OLD joints, or young ones for that matter, can be limbered by treatment with one of the B vitamins in addition to the diet, Dr. William Kaufmann of Bridgeport, Conn., reported at the Second International Gerontological Congress in St. Louis.

The vitamin he used is known medically as niacinamide. It is the anti-pellagra vitamin. Patients noticed improvement in their general health and they seemed younger to the doctor when getting the extra vitamin. Joints stiffened by age could be moved better and sometimes returned to full range of motion.

When the vitamin treatment was stopped, the joints stiffened again, but were once more limbered when the vitamin was started again. Although the treatment was designed for old people, whose joints are stiffer than young ones, it improves mobility of the joints at any age, Dr. Kaufmann reported.

Science News Letter, September 22, 1951

BACTERIOLOGY

Concrete Blocks Used To Raise Yeast Spores

➤ BETTER AND more efficient production of yeast spores—for beer and bread—can be secured by using concrete blocks for the growing of the spores instead of the usual gypsum blocks.

The spores are grown in the pores of the blocks.

Gypsum blocks, according to V. Hartelius and E. Ditlevsen of the Carlsberg Laboratorium, Copenhagen, Denmark, often become infected on repeated use with bacteria and cannot withstand the heat necessary to sterilize them. The concrete blocks prepared by the two scientists not only withstand sterilization heat, but also give somewhat better spore formation.

The scientists reported their findings in the British journal, NATURE (Sept. 1).

Science News Letter, September 22, 1951

AERONAUTICS

Airplane Liability for Accidents Facing Change

➤ THE LIABILITY to be paid in case of accidents causing injury or death to airliner passengers on international flights is facing a change, the International Civil Aviation Organization announced in Montreal.

The revision of the existing international laws limiting the liability of airline companies was the main purpose of a meeting in Madrid which began on Sept. 11.

Present regulations, which have been accepted by 40 of the 50-odd nations represented in the ICAO, fix the maximum liability for each passenger in case of bodily injury or death during an international flight at the equivalent of $8,291, American money.

There is also a maximum of $16.58 for each kilogram of checked baggage and cargo, and $331.67 for any possessions the passenger carries with him. These limits do not hold if an accident is due to wilful misconduct on the part of the air carrier.

What action will be taken can not be predicted. Some membership nations suggest that the present liabilities be as much as doubled. The regulations have been in effect since 1929 when adopted as a result of a convention in Warsaw. Another proposed change would affect the carrier's responsibility. If an air carrier is able now to prove that it and its agents had taken all possible measures to avoid the accident, it is not liable.

Science News Letter, September 22, 1951

INVENTION

Metal Polisher Gets Both Sides Smooth

➤ BOTH SIDES of a continuous strip of stainless steel, or other metal, are finished to a high degree of smoothness at the same time with apparatus which brought patent 2,567,163 to David A. Wallace, Grosse Pointe Farms, Mich. Chrysler Corporation, Highland Park, Mich., has acquired the rights by assignment.

The machine is claimed to finish metal strips much more rapidly than other devices for the purpose. The removal of irregularities, scale and foreign matter is accelerated by simultaneous abrading and pickling action. The liquid pickling treatment serves as a lubricating coolant in the abrading operation.

Science News Letter, September 22, 1951

TECHNOLOGY

New Image-Correcting Lens Improves Theater TV Shows

➤ CLEAR CUT television pictures on large-size motion picture theater screens are claimed with a new giant image-correcting lens developed by the American Optical Company of Southbridge, Mass. The projecting system in the theater will use this 22-inch lens in conjunction with a 26-inch spherical mirror.

The giant 15-by-20-foot pictures which appear on the screen reach the theater by private wires or radio beams and are picked up by a kineoscope, or television picture tube. The tube is small but it produces pictures of high brilliance. These pictures are magnified and thrown on the screen by the mirror. Distortions introduced by the magnification are corrected by the new lens so that the resulting picture on the screen is normal and in perfect focus.

Science News Letter, September 22, 1951

IN SCIEN

ASTRONOMY

Stars Seem Brighter With Freshly Coated Mirror

➤ TARNISH BETRAYS the age of the silver coating on the mirror of a reflecting telescope, but it is difficult to detect when an aluminum-coated mirror needs a new surface.

To the eye, the old coating often looks about as good as a fresh one, complain Dr. Joel Stebbins and J. Lynn Smith of the University of California's Lick Observatory at Mt. Hamilton, Calif.

Yet a new aluminum coating on the observatory's 36-inch Crossley mirror improved seeing 20% for ordinary photography, and even more than that for ultraviolet spectroscopy, the astronomers reported to the Astronomical Society of the Pacific.

Testing the mirror several nights just before and right after recoating, they found the same star a fifth of a magnitude brighter with the new coating.

Science News Letter, September 22, 1951

PLANT PATHOLOGY

Plants When Sick Run Temperatures, Too

➤ SICK PLANTS, like sick human beings, run a temperature.

In studying plants infested with various virus and fungus diseases, Prof. C. E. Yarwood, plant pathologist of the University of California College of Agriculture at Berkeley, found temperatures of diseased plant leaves from 0.1 degree to 2 degrees Centigrade (0.2 degree-3.6 degrees Fahrenheit) above healthy plants.

Fungus diseases produced higher temperatures than virus diseases.

The temperatures of healthy leaves tested were 0.5 degree to 1.5 degrees Centigrade (0.9 degree-2.7 degrees Fahrenheit) above that of the air. Diseased leaves were 0.6 degree to 3.5 degrees Centigrade (1.1 degrees-6.3 degrees Fahrenheit) above that of the air. Respiration raised healthy plant temperatures slightly above the surrounding air. Diseases increased respiration which in turn increased the temperature of the plant.

"In nature the heat radiated to and from the plant—plus normal growth processes—make it impossible to make accurate readings," said Dr. Yarwood. "Only in an isolated environment relatively free from all outside influences can true temperatures be taken. About four hours after plant leaves are put in thermos type containers the maximum temperatures can be read."

Science News Letter, September 22, 1951

ENE FIELDS

MEDICINE

Iodine, Thyroid Linked With Artery Hardening

➤ LACK OF iodine in the diet plays an important part in production of hardening of the arteries, Dr. N. Dungal of the University of Iceland at Reykjavik reported to the Second International Gerontological Congress in St. Louis.

A normally functioning thyroid gland is of fundamental importance for preventing and delaying artery hardening, he declared.

Signs of this link between the thyroid gland, iodine and artery hardening come from comparisons Dr. Dungal made between Icelanders and people living in a part of Austria where goiter is common because the people do not get enough iodine to keep their thyroids functioning normally.

Icelanders, Dr. Dungal found from over 2,000 autopsies, have less hardening of the arteries, particularly the aorta, biggest artery of the body, than people living in the goiter region of Austria. In fact, he said, it is "not rare" to find old people in Iceland with smooth aortas, whereas in Austria marked calcification, or hardening, of the arteries often is seen in persons in their fifties.

The average weight of the thyroid gland in Icelanders is small, about half that given in medical textbooks as the normal thyroid weight. And Icelanders have a normal amount of iodine in their thyroids. Persons living in the goiter region of Austria have greatly enlarged thyroid glands.

Science News Letter, September 22, 1951

INVENTION

Cheaper Germanium Crystal Cuts Cost of Rectifier

➤ A FORWARD step in replacing vacuum tubes in radio receivers with germanium rectifiers and amplifiers is promised with cheaper germanium crystals produced by a process on which the government has issued a patent.

The process uses a less pure germanium metal as a starting material and thereby greatly reduces the cost of manufacturing. The inventor claims the process results in a germanium crystal with improved electrical characteristics.

Germanium is a rather rare metal that has the property of being a semi-conductor of electricity. That is, it will pass electric current in only one direction. For this reason it can be used to rectify a current, that is convert alternating current to direct current. It can also be used as an electric amplifier. It is already coming into use to replace vacuum tubes in radio receivers and other instruments where simple amplifying is required.

The new crystals are made by reducing germanium dioxide in powder form in an atmosphere of hydrogen at a temperature of 700 degrees Centigrade. Then one percent of metallic tin is added, and one-tenth of one percent of additional germanium dioxide. The mixture is heated at a temperature of about 1,000 degrees.

Inventor is Salvatore F. Amico, East Boston, Mass. He received patent 2,565,338. Rights are assigned to Sylvania Electric Products, Inc., Salem, Mass.

Science News Letter, September 22, 1951

ENTOMOLOGY

Green Grass Gets Grasshoppers Green

➤ GROWING GREEN grass gets grasshoppers green.

This is the tentative conclusion of Selahattin Okay, a Turkish zoologist at the University of Cambridge in Cambridge, England. While, he says, the factors which lead to the production of green skin are still in doubt, he fed yellow grasshoppers of *Acrida turrita* various kinds of grass. They were kept in green cages, to test the theory that the grasshopper's background has something to do with his color.

When fed on growing grass, seven out of ten became green, when fed on cut grass changed every other day, only one in ten became green, and when fed on dry grass, none became green. On the other hand, only one-fifth of green grasshoppers in green cages stayed green when fed on dried grass, but three-quarters remained green on a diet of growing grass.

Mr. Okay says it seems possible that the formation of green pigment depends on the breakdown of chlorophyll. He hopes to confirm and extend his results in further laboratory experiments. The original grasshopper-feeding took place at the University of Ankara. It was reported in the British journal, NATURE (Aug. 11).

Science News Letter, September 22, 1951

CHEMISTRY

Two Heaviest Atoms Made As Fleeting Isotopes

➤ THE TWO heaviest atoms ever known to exist have been manufactured in the Radiation Laboratory of the University of California at Berkeley. They are berkelium 245 and californium 246. The new berkelium isotope has a half life of about five days. The new californium isotope has a half life of 35 hours.

These two new isotopes are reported by Drs. E. K. Hulet, S. G. Thompson, A. Ghiorso and K. Street, Jr.

Science News Letter, September 22, 1951

PSYCHOLOGY

People Shun Short-Term Plans, Admit Future Hopes

➤ PEOPLE ARE quite prepared to say what they hope to do or be in the distant future, but not what they hope to do next week or next year. Miss S. B. N. Shimmin, psychologist of London's Bedford College, found this out by having 60 intelligent young men and women answer a questionnaire.

In general the persons questioned agreed that their attitude was partly determined by a dread of showing off in any way.

In explaining their greater readiness to discuss remote ambitions and ideals, the subjects said they felt "safe" in admitting remote goals "because no one is likely to take them seriously," in contrast to any declared short-term plans.

"Once people believe you are striving to be or do something," said one person, "it's time to stop talking about it."

Miss Shimmin found that a person doesn't like people to "shine" too close to him.

Another's achievement is seen as a threat to the ego in some way. It draws recognition or approval of the crowd or of an admired person. It is considered an immediate obstacle to some desired position. This causes grudging admiration and a hostile attitude.

We don't mind people shining at a distance, Miss Shimmin found, as their achievements are often admired or taken as a goal to reach.

Science News Letter, September 22, 1951

AGRICULTURE

Yams, Chinese Kind, Seen As Important U. S. Crop

➤ THOUGH GROWN on a small scale at present, true yams might some day be another important food crop in the United States.

Already small commercial plantings have been made on the West Coast and food value tests are currently being run by Mastochi Yamaguchi, instructor in truck crops at the University of California College of Agriculture at Davis.

Moist types of sweet potatoes are often called yams in this country. Actually sweet potatoes are not related to true yams, which are native to China.

About 12,000 acres of sweet potatoes are raised in California each year. True yams are most frequently grown in the tropics where the season is longer than in this country. Both plants require a warm climate.

The long, thin tubers of Chinese yams vary in weight from less than one to several pounds. They are prepared and eaten like white or sweet potatoes.

Science News Letter, September 22, 1951

TECHNOLOGY

Climates Made To Order

Alaska and New Guinea are laboratory neighbors in tests that help design military equipment for all climates of the world.

See Front Cover

By WADSWORTH LIKELY

➤ AN ARTIFICIAL leg hangs on a hook in the "jungles of New Guinea." A truck motor chugs away in the "Arctic weather of Alaska." One man walks 30 feet and checks, within five minutes, on the condition of both.

These are man-made samples of the world's worst climates, frigid and tropical.

Outside the prosaic brick building which contains these extremes of weather, there is a typical warm and somewhat humid Virginia day. The humidity is something of a problem to the Climatic Research and Test Branch of the Army's Engineer Research and Development Laboratories, which controls the various climates inside. Put this Virginia air, suddenly, into a chamber where the temperature is 85 degrees below zero Fahrenheit, and the humidity becomes snow and ice.

On the other hand, the Virginia humidity is not enough for the tropical chamber. There, the engineers keep a constant humidity of 90% in the day and 95% at night.

Adjust to All Climates

This humid warmth, this dry cold, are produced because the responsibilities of the United States have become world-wide. With the broadening of our responsibilities has come a vast outpouring of American men—and the equipment necessary to them—to all climates of the world.

That equipment must be constructed so it can withstand the tropical heat and the arctic cold and still do its job efficiently. Hence, at Fort Belvoir in Virginia, the Army Engineers have simulated the varied climates of the world, so the equipment can be tested.

This climate laboratory is one of several such laboratories used for various testing and experimental purposes by different branches of the Armed Forces. The Air Force has one at Eglin Field and another at Wright-Patterson Field in Ohio. There is one at the Army Proving Grounds, Aberdeen, Md., and the Signal Corps tests communications equipment in climatic chambers at Fort Monmouth, N. J. The Navy has one at Dahlgren, Va.

Simulating the Arctic or the tropics in Virginia is no easy task. At first glance, it would seem that all that is necessary is one refrigerating plant for the make-believe Alaska and some steam pipes for New Guinea.

But the chambers themselves must be built to withstand these climatic extremes. In the tropical chamber, for instance, the shelves on which equipment is placed to be tested are made of California redwood, a wood that was found to withstand the high humidity and the attacks of fungi best. Even then, the redwood shelves last only two years before they rot into uselessness. The electric light circuits in the tropical chamber are in exposed conduits and must be constantly repaired.

Special Lubricants for Cold

The pump which circulates the ammonia in the Arctic chamber's cooling system takes a beating too. To get the temperature in the chamber down to minus 85 degrees Fahrenheit means that the ammonia which goes through the pump reaches a low of minus 100 to minus 110. No lubricant has yet been developed which lubricates at that temperature and so the pump sometimes has to contend with ice cubes of oil.

And then the engineers are faced with a peculiar sort of "which comes first, the chicken or the egg" problem. Delicate equipment is needed for testing purposes. But how do the engineers know that the testing equipment will provide accurate data readings under extreme temperature conditions? They must devise ways of testing the testing equipment.

Most of the data is recorded on steadily moving graphs or seen on oscilloscopes outside the Arctic chamber. These are attached by thermocouples to the parts of equipment to be tested. Other gadgets must measure accurately, at these extreme temperatures, the expansions and contractions which take place in various materials. The thermocouples and all the other gadgets must transmit accurate data at temperatures ranging from minus 94 degrees to plus 138. And they must also work at simulated altitudes up to 50,000 feet.

Chamber Placed on Rollers

While expansion and contraction are sometimes being measured inside the Arctic chamber, with instruments which themselves will withstand the effects of expansion and contraction, the chamber itself expands and contracts. To take care of this, the 32-foot long, heavily insulated chamber is placed on rollers.

The extremes in climate and altitude are not much health hazard to the men who work with the chambers. There seems to be no higher incidence of colds or diseases of the respiratory tract among them. However, they look out for possible cardiac conditions after the age of 50.

But rigid safety precautions are in effect. No man can go into the big Arctic chamber alone and a third man usually watches the two from the outside. On extremely rare occasions, however, the human factor enters.

Several years ago, Robert C. Faylor, chief of the Climatic Research and Test Branch, was in the chamber testing a motor. He planned to stay in about 40 minutes. In order to draw off the carbon monoxide gas, the operator on the outside turned on the vacuum pump.

When it came time for Mr. Faylor to leave the chamber, he found that he could not open the door to get out. The operator had neglected to blow any fresh air into the chamber to replace the air being taken out by the vacuum pump. Consequently, Mr. Faylor found himself at a simulated altitude of about 5,000 feet with the sea level altitude on the outside effectively sealing the door.

According to Mr. Faylor, the operator, at this point, was reading a magazine. When Mr. Faylor finally got his attention and he realized what the trouble was, he lost his head. Excitedly summoning several other men, he began prying the door open with crowbars, instead of turning on the fresh air.

They got the door open. This meant that Mr. Faylor dropped from a height of 5,000 feet to sea level in an instant. As the door came open, he screamed as loud as he could to relieve the impact of the pressure on his ear drums.

When Mr. Faylor came out of the suddenly "grounded" chamber, he let the operator have the benefit of his opinion and went home with nothing worse than a severe headache.

Building Desert Chamber

Now building is a new chamber. This will simulate conditions to be found in the desert. With this chamber the effects of intense solar radiation on motors, equipment and packaging materials can be tested.

The climate chambers are part of a four-step testing process through which all equipment goes. The first step is to test the machinery or equipment for its inward functioning. This can be done completely at Fort Belvoir.

The second step is to find out the relationship of the machine to its operator in various climatic conditions. A part of that process can be accomplished at Fort Belvoir.

The third step is to test the relationship of the machine-operator team to the job it has to perform. And the final step is

service-testing by the Army unit which will use the machinery.

Part of the second step, and all of the third are accomplished at testing grounds in Fort Churchill, Canada, and in Arizona, where the Army Engineers maintain establishments.

Americans are counting on their technical superiority to maintain a lead over the greater manpower of the Communist nations. For this to count, our technology must be effective all over the world, in all kinds of weather. The Army Engineers' Climatic Research and Test Laboratory is designed to make sure that this happens.

Science News Letter, September 22, 1951

INVENTION

Patent Electrically Heated Clothes Drier for Home

➤ QUICK DRYING of clothes in the home is promised with an electrically heated clothes drier which brought patent 2,567,434 to Alice P. Hoskings of San Diego, Calif. It resembles the familiar rack now widely used which has two side pieces, and cross pieces on which the garments are hung. In this, the crossarms are hollow and have heating elements inside them. The household current provides the energy.

Science News Letter, September 22, 1951

CHEMISTRY

Hit DDT Resistant Flies

➤ A SWISS discovery of a new insecticide that knocks down and kills flies that are resistant to DDT was announced to the World Chemical Congress in New York. Growing resistance of flies to DDT has limited its effectiveness in the last year or so.

It is called Pyrolan and the claim is that it is not dangerous to man and other warm-blooded animals as its toxicity corresponds approximately to that of rotenone. This promises to allow its use where DDT can not now be used.

Already in Switzerland and Sardinia tests, the new insecticide has freed for several weeks rooms of flies that are not affected by DDT. Moreover, the house fly does not seem to develop a resistance to Pyrolan.

Dr. Robert Wiesmann of the J. R. Geigy Co. of Basle, Switzerland, presented the paper to the congress, but Dr. H. Gysin synthesized the new chemical which has the complex structure of 1-phenyl-3-methyl-pyrazolyl-(5)-dimethylcarbamate.

The new insecticide has the advantage of not affecting moths, butterflies, roaches and beetles. Insects taking up food by sucking may be killed by small doses.

The quick action of Pyrolan is one of its most useful properties and in this respect it will compete with rotenone, a natural product, used in fly sprays for quick knock down of the insects.

Du Pont also gave details of an insecticide with a wide range of insecticidal action. It is known as EPN, and chemically it is ethyl p-nitrophenyl thionobenzene-phosphonate.

It has been in use since the spring of 1950 when it was used to control mites in the Pacific Northwest. It is effective against orchard pests and European corn borers, Dr. S. S. Sharp of Du Pont reported.

Science News Letter, September 22, 1951

ENGINEERING

Water Tunnel Carries Cable

➤ WATER and electric power are both being carried through a tunnel under the Continental Divide in Colorado, the tunnel being built to provide irrigation water to farmlands on the eastern slope of the Rockies.

The tunnel, recently constructed, is 13 miles in length and is known as the Alva B. Adams water tunnel. It brings water from the western slope of the Divide to the eastern slope. At the time of its construction no thought was given to its use to carry electric cables. This idea developed when plans were made to transmit electric power from the Granby Pumping Plant on the west side to the Estes Power Plant on the east.

This unique underground installation of an electric cable was described to the American Institute of Electrical Engineers meeting in Portland, Ore., by F. M. Wilson and R. A. Nelson of the U. S. Bureau of Reclamation. The tunnel was used to avoid the difficulties of erection and maintenance of transmission lines if built over the top of the Divide through the 11,850-foot Buchanan Pass.

The principal part of the electrical installation was made during the winter months of 1949-50 when the tunnel could be drained of water. The circuit consists of three single-conductor cables housed in a steel cable which is filled with nitrogen at an average pressure of 200 pounds per square inch. The cable is hung from the roof of the tunnel, suspended by 71 anchors of corrosion-resistant stainless steel.

Provision was made in the design to use the cable circuit for carrier current communications, the engineers were told. The initial installation will include two communication channels over the Phase A conductor. One future channel over the Phase C conductor is planned.

Science News Letter, September 22, 1951

THE Editors of SCIENTIFIC AMERICAN are privileged to announce publication of a special issue devoted wholly to an assay of our country's most precious resources—its people and its brainpower.

The rising demand in our economy for intellectually trained and able personnel now raises a serious question of supply: "Can our population continue to produce enough people with the specialized abilities necessary to staff and administer our complex society?"

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BOTANY

NATURE RAMBLINGS

Chicory

➤ AUTUMN BRINGS a brave array of bright flowers that shine on in spite of shortening days and even defy the frost that begins to nip at night.

Goldenrod, wild aster, helenium and fringed gentian are old-time favorites among the native plants; but they have been joined, since the settlement of America, by a number of recruits from Europe and Asia that are as hardy as they and frequently very attractive in the bargain.

Well up in the ranks of these we must recognize the chicory, that hardy garden herb that has escaped almost everywhere in settled regions and is now one of the sturdiest and most independent of our semi-weeds.

Roadsides and waste places are gay throughout the summer and autumn with the blue flowers of this upstanding weed that very evidently knows how to make its own way in the world and asks for no favor from anybody.

It begins to produce its sharp-blue flowers fairly early in the summer and does not stop until really severe frosts cut it down altogether. Chicory is a perennial, storing food for the next season in its thickened root; and it would probably be in bloom all the time if the climate permitted. Its native home is temperate Europe and Asia, probably originally somewhere along the Mediterranean.

Chicory did not come into America as a stowaway, as did many of our worse weeds. It was brought here deliberately, and cultivated in gardens, from which it escaped to the roadsides and fallow fields.

What the history of chicory was in ancient times we have few documents to tell us, but since the discovery of coffee and its popularization as a European and American drink, chicory has been called on in times of stress to supply a substitute for the flavor most of us have come to be fond of in our morning cup.

It is, to be sure, a very poor substitute, making a thin and bitter drink which very few take unless they are forced into doing so by circumstances. Its thick, hard root, containing a bitter principle, is dried up and used either by itself or to eke out the more expensive coffee.
maintains a real popularity among gourmets, in spite of the fact that its product also

Chicory has a close cousin, however, that has a characteristically bitter taste. We seem to like a bitter tang, if it is a kind we have grown used to. This popular cousin of chicory is the well-known salad-plant, endive.

Science News Letter, September 22, 1951

ENTOMOLOGY

Chemical on Screen Strips Routs Flies in New Mexico

➤ CORNELL UNIVERSITY entomologists have developed a revolutionary method of house fly control in dairy barns that threatens the "flit gun" method with oblivion.

Strips of screening about ¾ inch wide and 100 feet long are dipped in an insecticide called dieldrin and hung along the ceilings. Flies are irresistibly attracted to the strips and die soon after contact.

To perfect the new technique, the professors virtually lived with the flies, watching and recording their every move. They noticed that the little pests were partial to narrow objects as resting places, and preferred screen surfaces to wood, glass or metal. Screen strips placed near the ceiling were especially attractive.

Because of its high toxicity and non-repellant quality, dieldrin proved an ideal material. It gave good control for 16 weeks or more. The treated screening killed houseflies in five seconds in laboratory tests.

The new strip method removes the danger of milk contamination since the screening may be dipped and dried outside the barn, and fastened to the ceiling out of reach of livestock.

For various reasons, use of these strips have not yet been sanctioned by the Food and Drug Administration, but it is expected that official permission will be granted when second year's data are on official record.

The work was done by Drs. David Pimentel, H. H. Schwardt, and L. B. Norton of Cornell University in Ithaca, N. Y.

Science News Letter, September 22, 1951

STORY of the GEMS

By HERBERT P. WHITLOCK

Curator of Minerals and Gems,
American Museum of Natural History

"The best popular book on gems we have seen . . . Combines in happy fashion the complete mineralogical background of precious and semi-precious stones with enough of the fascinating history of gems to make the book much more than a manual of cuttable stones . . . Very fine illustrations of cut gems, some in color, and of carved jade and other precious stones. An excellent book for the small library since it covers accurately a wide field."—*Saturday Review of Literature*

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PSYCHOLOGY

How to Help Child Talk

➤ MOST CHILDREN begin to talk by the time they are two years old. But quite a number do not start talking till they are three or even four.

Sometimes this is because of a hearing defect, mental backwardness or other handicap. When the chief problem, however, is that of helping the child reach a stage of readiness for speech, parents may find helpful the following suggestions from the National Hospital for Speech Disorders:

1. Talk slowly to the child and use simple language. He will more readily understand, and be more likely to repeat, a simple two- or three-word combination that contains the essentials of a sentence, like "Go bye bye" or "Get a drink," than a more complex statement.

2. Give the child many auditory experiences by reading simple stories to him, stressing the important words or actions, and by playing suitable records for him. On shopping trips or other excursions, or about the home, point out familiar objects repeating their names several times. If the child shows an interest in an object, let him handle it, if possible, while you say its name for him. In this way, other senses will help establish the association between the object and its verbal symbol.

3. Put into words for the child the everyday actions he performs:

"We are going to eat," . . . "We get a drink," . . . "We put on shoes."

4. Don't, however, continually urge the child to talk or make him feel that because he doesn't speak he is less acceptable to you than other children are to their parents. Making him feel insecure or anxious will only add to his difficulty.

Science News Letter, September 22, 1951

CHEMISTRY

Heat-Glowing Crystals

Practical radiation dosimeter may result from discovery that glow given off by minerals when heated is due to electrons escaping from "traps."

➤ AN OLD chemical mystery, why crystals glow in the dark when heated, has been solved by University of Wisconsin scientists.

The discovery has opened up entirely new fields of research and application in chemistry, geology, mineral prospecting, and in the development of a practical radiation dosimeter that can be used as a dog tag to measure the amount of radiation to which individuals are exposed during an atomic bomb blast.

The study under an AEC grant was conducted by Dr. Farrington Daniels, professor of chemistry, Donald F. Saunders, project assistant, and other Wisconsin scientists.

They found that the glow given off by certain mineral crystals when heated is caused by electrons escaping from "traps" in the lattice-like structure of the crystal. The electrons are driven into the traps by radioactivity either from very small amounts of natural radioactive substances or by man-made radiation in the laboratory. When the chemical crystal is heated slightly, the electrons escape the traps and fall back to their normal positions, emitting light in the process.

The phenomenon is much more common than had previously been realized. Practically all limestone and granites will emit light when heated—as anyone can learn by grinding a small piece of limestone into powder, placing it in a frying pan, and heating almost red hot in the dark.

A few prospectors have known for years that some minerals will glow for a moment when heated, but it was not known that small amounts of uranium and thorium furnished the radioactivity necessary for the trick. Because of the small amounts of these elements present in most minerals, centuries are required for the trapping of enough electrons to give a few seconds' glow.

During an atomic bomb blast, however, the radioactivity would be so intense that crystals of lithium fluoride, for example, would trap sufficient electrons in a few seconds to glow when heated.

The amount of radiation to which a lithium fluoride dog tag was exposed would determine the intensity of the glow. The Wisconsin scientists have designed a thermoluminescent apparatus to heat the crystals and record the amount of light emitted.

Use of such a device could enable authorities quickly to divide a population exposed to radiation into groups of individuals requiring similar medical treatment.

Another use for the thermoluminescent capacity of minerals may be in the field of oil exploration. Limestone samples taken from various depths of one drilling can be compared with samples from other wells to aid in predicting whether or not the same oil-bearing strata are present.

Science News Letter, September 22, 1951

ENTOMOLOGY

Tiny Wasps Conquer Red Scale of Citrus

➤ RED SCALE, a tiny insect that damages orange, grapefruit and lemon trees at an annual cost to growers of millions of dollars, can be controlled by two gnat-sized wasps that feed on the pests, a University of California entomologist in Riverside has found.

Until now orchard growers have had to rely mainly on insecticide sprays to stop the red scale that attacks the leaves, bark and fruit of citrus trees. Paul DeBach of the University's Citrus Experiment Station termed the two tiny wasp parasites the "first examples of satisfactory control of the red scale by any means other than chemical."

One of the parasitic wasps, commonly called the golden chalcid, has been known in California for over 50 years, but only recently has it been used for control of red scale. The other wasp was imported from China four years ago.

Insecticides sprayed on the trees and ants in the orchard seem to hinder the work of the wasps in cleaning orchards of red scale. Preliminary tests show that for best results the parasite wasps should be released periodically throughout the year.

Science News Letter, September 22, 1951

INVENTION

Gas Discharge Device For Safes Foils Burglars

➤ SAFER SAFES for money and valuables are promised with a device to attach to the inner panel of the door which contains a noxious gas powerful enough to overcome a robber. Other devices of this sort are in use but they are built-in affairs. This improved type can be attached in most any safe.

The gas is in a container that is easily broken whenever impact or pressure is applied to the tumblers of the safe combination tending to drive them inward. The most frequent attempts against safes are made by "knob knockers" whose method is to knock off the knob or dial of the combination lock, and then drive the tumblers far enough inward so that the latch bolts can be released and the door opened.

Inventor is Harry W. Srygley, Abilene, Texas. Patent 2,566,587 was his award. The invention does not save the lock from injury but it does save the contents of the safe.

Science News Letter, September 22, 1951

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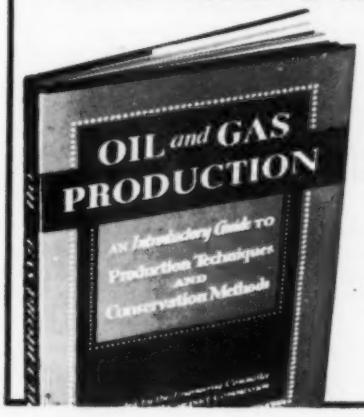

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ADVENTURES IN AVIATION EDUCATION—H. E. Mehrens—*American Council on Education*, 401 p., illus., $3.50. A book for teachers telling about how aviation can be introduced into the curriculum from kindergarten to high school. Words learned in kindergarten now include aileron, beacon, Convair, blimp, fuselage and rotor.

ALMOST SINUSOIDAL OSCILLATIONS IN NONLINEAR SYSTEMS: Part I, Introduction, Simultaneous Oscillations—Johannes S. Schaffner—*University of Illinois*, 64 p., paper, 60 cents.

BIOCHEMISTRY AND PHYSIOLOGY OF PROTOZOA Volume I—Andre Lwoff, Ed.—*Academic Press*, 434 p., $8.80. Bringing together contributions to this neglected field.

THE BIRDS OF MICHIGAN—Norman A. Wood—*University of Michigan Press*, 559 p., illus., paper, $4.00. A reference work listing all species and subspecies for which there are unquestionable Michigan records.

CLEAVAGE FRACTURES OF SHIP PLATES—Wilbur M. Wilson, R. A. Hechtman and W. H. Bruckner—*University of Illinois*, 95 p., illus., paper, $1.00. Report of an investigation to determine factors causing formation of fractures.

CULTURAL STUDIES ON CARROT STECKLINGS IN RELATION TO SEED PRODUCTION—Leslie R. Hawthorn—*Govt. Printing Office*, 21 p., paper, 10 cents. Results of experimental plantings to determine how to produce the most and the best carrot seeds.

DOMESTIC CONTROL OF ATOMIC ENERGY—Robert A. Dahl and Ralph S. Brown, Jr.—*Social Science Research Council*, 117 p., paper, $1.00. In this field, the authors point out, "public policy of extraordinary importance frequently seems to be decided in a political void created by public apathy." This study was designed to find out what social science research should contribute to solution of the problem.

EPICS OF ESPIONAGE—Bernard Newman—*Philosophical Library*, 270 p., $4.50. You will enjoy re-reading these famous spy stories.

AN EVALUATION OF THE HARDENING POWER OF QUENCHING MEDIA FOR STEEL—Earl J. Eckel, Ross M. Mayfield, Glen W. Wensch and Frank A. Rough—*University of Illinois*, 131 p., illus., paper, $1.50. Although the quenching of steel was first mentioned in the Odyssey, 900 B.C., the relative value of different quenchants has been largely a matter of opinion.

THE HEALTH OF THE MIND—J. R. Rees—*Norton*, 207 p., $2.75. How to attain mental health for yourself and for the young people for whom you may be responsible.

HERBERT H. DOW: Pioneer in Creative Chemistry—Murray Campbell and Harrison Hatton—*Appleton*, 168 p., illus., $3.50. The life of the founder of the Dow Chemical Company and one of the creators of modern chemical industry.

LET'S START COOKING—Garel Clark—*Scott, W. R.*, 68 p., illus., $1.50. Recipes in step-by-step drawings and easy text for beginning cooks.

MANUAL OF TUMOR NOMENCLATURE AND CODING — Subcommittee, Statistics Committee, American Cancer Society—*American Cancer Society*, 119 p., $2.50. Aid for record librarians and research workers in compiling statistics on tumors.

MINERALOGY: An Introduction to the Study of Minerals and Crystals—Edward Henry Kraus, Walter Fred Hunt and Lewis Stephen Ramsdell—*McGraw-Hill*, 4th ed., 664 p., illus., $7.50. A text for beginning students.

THE NATURE OF THINGS—Roy K. Marshall—*Holt*, 188 p., illus., $2.95. The author of a popular television program on science has attempted to translate his program into book form.

NORTHERN RHODESIAN BIRDS—Rodolphe Meyer de Schauensee—*Academy of Natural Sciences of Philadelphia*, 63 p., paper, $1.20. A description of the large collection of the Academy.

PERSONALITY AND GOVERNMENT: Findings and Recommendations of the Indian Administration Research—Laura Thompson—*Instituto Indigenista Interamericano, Mexico*, 229 p., paper, $2.00. A disinterested and independent evaluation of the U. S. policy toward the Indians with recommendations.

PREPARING TECHNICAL MATERIAL FOR PUBLICATION: A Manual for Authors of College and Station Publications—Lisle A. Rose, Elmer F. Heater and George R. Foster—*University of Illinois*, 39 p., paper, 60 cents. A style book for technical authors including proofreading marks.

RADIANT BASEBOARD HEATING AND EFFECTS OF REDUCED THERMOSTAT SETTING AND OPEN BEDROOM WINDOWS AT NIGHT—Warren S. Harris and Robert H. Weigel—*University of Illinois*, 67 p., illus., paper, 70 cents. Information of interest to home owners and heating engineers.

THE RESTLESS UNIVERSE—Max Born—*Dover*, 2nd ed., 315 p., illus., $3.95. Scientists and students will welcome this new revised edition of a book that has been out of print for several years. A novelty is a sequence of diagrams by means of which you can see molecules in action by flipping the pages. Translation by Winifred M. Deans.

SCIENCE NEWS 21—A. W. Haslett, Ed.—*Penguin*, 126 p., illus., paper, 50 cents. Another in this interesting British series of collections of scientific articles.

TIME'S ARROW AND EVOLUTION—Harold F. Blum—*Princeton University Press*, 222 p., illus., $4.00. The author, a biologist, points to a part played by the Second Law of Thermodynamics in the course of evolution.

200 MILES UP: The Conquest of the Upper Air—J. Gordon Vaeth—*Ronald*, 207 p., illus., $4.50. Telling about the highest flights yet made and the information they brought back about the atmospheric sea above.

VITALIZING SECONDARY EDUCATION—*Govt. Printing Office*, 106 p., paper, 30 cents. Report of the First Commission on Life Adjustment Education for Youth issued by the U. S. Office of Education.

THE WORLD OF COPERNICUS (SUN, STAND THOU STILL)—Angus Armitage—*New American Library*, 165 p., illus., paper, 35 cents. The life and work of the founder of modern astronomy by an English scholar. Originally published by *Schuman*.

YOU AMONG THE STARS—Herman and Nina Schneider—*Scott, W. R.*, 58 p., illus., paper, $2.25. An attractively illustrated book to get young people acquainted with the universe.

Science News Letter, September 22, 1951

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INVENTION

Cider Mill Turns Out Juice While You Wait

➤ A CIDER MILL for the roadside stand grinds up apples and turns out the juice while the patron stands by awaiting his glass of beverage. It can be used for other fruits. It is a quick-acting device which separates the juice from the pulp by centrifugal action.

Patent 2,567,371 was awarded for it to Lyonal D. Forkey, Norwell, John T. Peterson, Melrose, and Henry I. Morton of Needham, Mass.

Science News Letter, September 22, 1951

CHEMISTRY

Zirconium Metal Produced

➤ DISCOVERY OF a new and efficient way of obtaining zirconium, a metal needed for use in atomic reactors and power plants, has been made through use of a new fluorine-containing organic chemical.

This was made known to the American Chemical Society meeting in New York by Dr. James O. Hendricks of the Minnesota Mining and Manufacturing Co., St. Paul, Minn., who told of new ways of using fluorine, once known principally as a dangerous gas.

Using the process of electrochemical fluorination developed by Dr. J. H. Simons of Pennsylvania State College, a series of perfluoro organic acids have been made. With a compound of one of these called TTA (thenoyl trifluoroacetone) zirconium can be separated from hafnium with which it occurs.

This separation is of interest to the Atomic Energy Commission presumably because zirconium resists high temperatures created in generating atomic power and because it is relatively stable against bombardment by neutrons, the triggers of the atomic bomb.

The greatest reduction in surface tension of water yet accomplished comes through use of higher perfluoro acids and their salts made by the same process. These will be used in electroplating and foaming processes.

New kinds of colorless, transparent thermoplastic resins result from reacting acetylene with a number of perfluoro acids.

Exceptional efficiency in flame extinguishing is shown by another new chemical, trifluoromethyl bromide, which gives relatively non-toxic substances after the flame is put out.

Science News Letter, September 22, 1951

CHEMISTRY

Declaration Preserved

➤ LONG LIFE is promised for the Declaration of Independence and the Constitution of the United States is expected as a result of extended investigation at the National Bureau of Standards in a joint program with the Library of Congress and the Libbey-Owens Ford Glass Company.

President Truman and other high government officials attended ceremonies Sept. 17, at which the sealed-in documents were placed on exhibition in the shrine at the Library of Congress.

The preservation of such valuable documents as these presents many difficulties if they are to be placed where they may be viewed by the public. They must be protected by a suitable transparent cover through which they can be seen. They must be preserved in an atmosphere containing no oxygen because oxygen is destructive to parchment.

The enclosure must contain the proper amount of moisture because too much or too little is harmful. Also the parchments must be protected from detrimental light radiation.

As a result of these studies, helium has been selected as the gas to use inside the enclosure because it is inert and does not enter into chemical reaction with any other substance as far as is known, and because it will not support living organisms that might cause destruction. The enclosure within which the documents and the helium are contained must be air-tight.

Relative humidity within the case should be maintained between 25% and 35% at room temperature, it was determined. This humidity is found to be best for the long-range durability of collagen, the protein material which is the basic constituent of parchment.

Radiation containing invisible ultraviolet light and visible blue and violet light damages documents such as the Declaration of Independence and the Constitution of the United States. Protection is now provided from such radiation by a cover door of laminated glass within which a plastic interlayer is incorporated of a material that will absorb the unwanted rays.

As a result of these studies, the two priceless documents are now sealed in air-tight envelopes, each envelope consisting of two panes of special glass bonded to a metal frame. Each document rests upon special pure cellulose backing paper in an inert atmosphere of almost pure helium, maintained at the proper humidity.

Facilities for detecting any gas leakage of the helium are provided. A thermal conductivity type of gas analyzer is employed. This detector is based upon the fact that each gas is unique in its ability to transfer heat. A change in the conductivity means there has been a change in the composition of the gas.

The Declaration and the Constitution are unique and irreplaceable documents. Except for a short period during the Revolutionary War, adequate measures of care have been taken in keeping with the scientific knowledge of the times. This care accounts for the present excellent condition of the documents.

Science News Letter, September 22, 1951

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SELF-WATERING flower pot, a plastic decorative device for use in the home, is rectangular in shape and fits into a black plastic water-holding base. A wick through the bottom of the vase carries water to the plant roots by capillary action. One filling of water lasts a week.

Science News Letter, September 22, 1951

TAX COMPUTER, a relatively inexpensive device to give the exact Federal old age benefit and withholding tax deductions for each pay check, is a small cylindrical device for the bookkeeper's desk, operated by a turn of a knob. Tax computing tables are printed on a plastic cylinder.

Science News Letter, September 22, 1951

SNOW-REMOVAL machine, electrically-operated and designed to clear the home sidewalks, is a two-wheel device pushed forward by a lawn-mower handle which contains a small motor activated by cable connection to the household current. It will toss snow up 20 feet to the right or left as desired.

Science News Letter, September 22, 1951

RUBBER-CONTAINING paper is not the usual coated paper, but is made of pulp into which the synthetic material known as neoprene in latex form is mixed. The result is a high wet-strength, chemical-resistant paper for uses ranging from porch rugs to disposable diapers.

Science News Letter, September 22, 1951

"SPECTROSPHERE" is a cylindrical chamber with a viewing window, as shown in the illustration, used to compare the brilliance and fire of gem stones, the presence of single or double refraction and variation in the dispersion of light between different stones. The gem rotates during the inspection.

Science News Letter, September 22, 1951

TABLE-VIEWER for photographic slides is plugged into the household current and can be used in broad daylight or in a brightly lighted room. Transparencies inserted in it gives pictures four times the size of the slide on a screen near its top. Colored slides are reproduced vividly.

Science News Letter, September 22, 1951

BELL ATTACHMENT for ice skates, recently patented, gives a ringing sound when the skate is slightly tilted. The bell is at the top of an upright shaft, fixed by an arm to the right or left of the skate. When the skate is tilted the lower end of the shaft makes contact with the ice.

Science News Letter, September 22, 1951

LAMP FOR the telephone that automatically turns on when the telephone bell rings has just received a patent. Sound waves from the bell actuate the switch that turns on the electricity. It is particularly for use at night to aid in reaching a ringing phone.

Science News Letter, September 22, 1951

Do You Know?

Many *birds* like cherries and eat quantities while they are still on the trees; they seem to like sour cherries as well as the sweet types.

Japanese *beetles* spend the winter about eight inches deep in the soil.

About two pounds of the *alumina* made from bauxite are needed to produce one pound of aluminum.

Green cabbage *caterpillars* may be killed by insecticide dusting; there is no easy control for the egg-laying white moth into which they develop.

One of the earliest radio *broadcasts* was from the Metropolitan Opera House on Jan. 13, 1910.

Ground *corn cobs* make an excellent garden mulch.

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